TMS Neuhaus GmbH
Büro- und Praxisbedarf

CE IVD

Rapid test for semi-quantitative detection of CrP (C-reactive Protein) in whole blood, serum or plasma

Art.Nr. M2111038 / REF 21.079

TMS CRP

INTENDED USE
The Dutch Diagnostics CRP Test is a rapid chromatographic immunoassay for the semi-quantitative detection of C-reactive protein (CrP) in whole blood, serum and plasma samples as an aid in the diagnosis of inflammatory condition. The test is for professional in vitro diagnostic use. The lower cut-off of the CRP Test is 10 µg/ml.

SUMMARY
CrP (C-reactive protein) is an acute-phase-protein and has been found in association with acute infections, necrotic conditions and a variety of inflammatory disorders. There is a strong correlation between serum levels of CRP and the onset of the inflammatory process. CrP is synthesized in the liver and is induced by proinflammatory cytokines, especially Interleucin-6. Via the plasma, CrP is delivered to the sites of inflammation, where it actively contributes to the innate immune response. Systemic inflammation is usually accompanied by an increase of CrP concentration in blood. For diagnostic purposes, CrP is often used to differentiate between viral and bacterial infections, as the increase in CrP is more enhanced in bacterial infections.

TEST PRINCIPLE
The CRP Test is a rapid test strip for visual interpretation, based on specific antibodies against human CrP. The concentration-dependent formation of test lines allows a rapid semi-quantitative determination of CrP in whole blood, serum and plasma samples. The tip of the test strip is dipped into the test sample which is diluted with buffer solution. The sample now moves through the test strip from bottom to top. If the test sample contains CrP, it attaches to the first anti-CrP antibody which is conjugated with a red gold colloidal for color marking. The red CrP-antibody- gold complex, together with the sample liquid, diffuses through the membrane that is pre dispensed with lines of different amounts of the second anti-CrP antibody. The CrP-antibody-gold complex is immobilized by the second antibodies leading to the formation of red lines. The number of lines depends on the CrP concentration in the sample. The more CrP is contained in the sample, the more red lines become visible. At the end of the reaction zone on the membrane, a red control line is formed, which indicates that the test has performed properly. The formation of the control line is independent of the CrP concentration in the sample. Absence of the red control line indicates an invalid result. The test should then be repeated with new test and sample material.

REAGENTS
The test strips include anti-CRP antibody coated particles and CRP antibody coated on the membrane.

MATERIALS SUPPLIED
- Test strips single sealed in foil pouch
- Tubes with diluent buffer
- End- to-end- capillaries (10 µl)
- 1 Plastic holder (for buffer vials)
- 1 Instruction for use

MATERIAL REQUIRED BUT NOT PROVIDED
- Timer
- Lancets (for use with whole blood from fingertip)
- Micro-pipets (for use with serum/plasma specimens)
- Centrifuge (for preparing serum/plasma specimens)

PRECAUTIONS
- For professional in vitro diagnostic use only.
- Read carefully the instructions for use before starting the test procedure.
- The test components are for single use only.
- Do not use the test components beyond the printed expiration date.
- The test strip is humidity-sensitive, do not open the foil pouch until you are ready to perform the test.
- Do not use the test if the foil pouch is damaged.
- Humidity and high temperature can adversely affect results.
- Do not dip the test strip into the sample above the MAX-line.
- Do not touch the tip or the reaction zone of the strip to avoid contamination.
- Avoid cross-contamination of specimens by using a new specimen collection container for each specimen obtained.
- Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are being tested.
- Do not eat, drink or smoke in the area where the specimen or devices are handled.
- All patient samples should be treated as if capable of transmitting disease. Observe established precautions against microbiological hazards throughout testing and follow standard procedures for proper disposal of specimens.

STORAGE AND STABILITY
The test components should be stored at 2 - 30°C. Don't freeze!
Unopened, the test can be used until the expiration date printed on the kit. The test strip must remain in the sealed pouch until use.

SPECIMEN COLLECTION AND PREPARATION
Before performing the test, please make sure that all components are brought to room temperature before opening (see storage). Cold buffer solution or moisture condensation on the membrane can lead to invalid test results.
- Take a tube with buffer solution out of the kit.
- Document patients name or ID on it.
- Open the screw cap.

Sample Taking and Storage
- Collect the specimen according to standard procedures.
- Do not leave specimens at room temperature for prolonged periods. Serum and plasma specimens may be stored at 2-8°C for up to 3 days. For long term s torage, specimens should be kept below -20°C. Whole blood collected by venipuncture should be stored at 2-8°C if the test is to be run within 2 days of collection. Do not freeze whole blood specimens. Whole blood collected from fingertip has to be tested immediately.
- Bring specimens to room temperature prior to testing. Frozen specimens must be completely thawed and mixed well prior to testing. Avoid repeated freezing and thawing of specimens.
- EDTA-, citrate- or heparin- blood can be used as well. Before performing the test, it has to be diluted accordingly with the supplied buffer.
- With the supplied capillary, take a volume of exact 10 µl from blood specimen. It is important that the included end-to-end capillary is filled until the upper end. Due to hygienic reasons, hold the capillary with a capillary holder or tweezers. Alternatively, the blood can also be taken with a micro pipette. Please note: In case of using micro pipettes or other capillaries a sample volume of exactly 10 µl must be administered.

Sample Dilution / Sample Stability
- Administer the blood-filled end-to-end capillary (10µl) into the plastic tube with dilution buffer. Alternatively, the 10 µl of specimen can be added directly with the micro pipette or a different capillary into the buffer. Please dilute the blood sample immediately to avoid clotting.
- Close the buffer vial and mix well for around 10 seconds to suspend the specimen completely into the buffer.
- Let the diluted sample rest for approximately 1 minute.
- The sample can then be used immediately or be stored cooled for up to 8 hours.

TEST PROCEDURE
Bring tests, specimens, buffer, and/or controls to room temperature (15-30°C) before use.
1. Adjust the timer to 5 minutes!
2. Open the foil pouch and take out the test strip at the end labelled with CRP. Do not touch the tip of the strip or the white reaction field with your fingers Place the test strip on a clean, flat surface. For best results, the test should be performed within one hour.
3. Open the tube with the diluted sample and dip the test strip with the tip into the liquid. Make sure to dip the test strip not above the line for the maximum immersion depth (MAX line). Avoid in any case a direct wetting of the reaction field by lateral dashes or dipping the test strip to deep.
4. Leave the test strip for minimum 10 seconds in the diluted sample until the slightly pink-colored liquid front becomes visible in the reaction field.
5. Take out the test strip and put it to a clean flat underlay that does not dehydrate the test strip (e.g. the test pouch). Start the timer.
6. Wait for the appearance of colored lines. Read the result after 5 minutes. Stick exactly to this timeline to ensure correct semi-quantitative results.

INTERPRETATION OF RESULTS
Please note that the test must be read after exactly 5 minutes!
To interpret the results please look at the line pattern that has formed in the white reaction field.

Result	Output	Interpretation
POSITIVE	1 up to 3 test lines and 1 control line appear	
	1 red test line (T3) and 1 control line (C)	A Control line (C) and a test line (T3) appear, this indicates a CrP level of 10 µg/ml at least.
	2 red test lines (T3+T2) and 1 red control line (C)	From ca. 40 µg/ml a second test line appears above the first test line.
	3 red test lines (T3+ T2 +T1) and 1 red control line (C)	From ca. 80 µg/ml a third test line appears above the first and second test line.
NEGATIVE	Only the red control line appears	
	No test line (T) 1 red control line (C)	If only the Control line appears, but no test line appears, the CrP concentration is below 10 µg/ml.
INVALID		
	No control line appears. In that case, please read again carefully the instruction and repeat the test with new test strip, new capillary and new sample. If the problem persists, please contact the manufacturer.	

Hergestellt für
TMS Neuhaus GmbH
Südstraße 25
47475 Kamp-Lintfort

fon 02842 331 0
info@tms-neuhaus.de
www.tms-neuhaus.de

Dutch Diagnostics
human and animal care

Hersteller
Dutch Diagnostics BV
Hekkehorst 3
7207 BS Zutphen

fon +31 575 512 300
info@dutch-diagnostics.com
www.dutch-diagnostics.com

CE IVD

Rapid test for semi-quantitative detection of CrP (C-reactive Protein) in whole blood, serum or plasma

Art.Nr. M2111038 / REF 21.079

TMS CRP

Note
- The intensity of the color in the test region (T) may vary depending on the concentration of CrP present in the specimen. Therefore, any shade of color in the test region should be considered positive. Please note that this is a semiquantitative test only and cannot determine the concentration of analytes in the specimen.
- Please read the test only once after 5 minutes. It is quite natural for immunochromatography and the kinetics of rapid tests that the intensity of all lines increases over time. If the test is read later, an accurate semiquantitative interpretation of the test result is not ensured any more, as low concentrations would be estimated too high.
- Insufficient specimen volume, incorrect operating procedure or expired tests are the most likely reasons for control line failure.

QUALITY CONTROL
Internal procedural controls are included in the test. The colored line appearing in the control region (C) is considered an internal positive procedural control, confirming sufficient specimen volume and correct procedural technique.
External controls are not supplied with this kit.

LIMITATIONS OF PROCEDURE
- The CRP Test is for professional in vitro diagnostic use, and it should only be used for the semiquantitative detection of C-reactive protein.
- CrP is not a specific marker for a certain disease. The CRP Test will only indicate the semiquantitative level of CrP in the specimen and should not be used as the sole criteria for evaluating inflammatory conditions.
- Like with all in vitro diagnostic rapid tests, the result should not be interpreted on its own but must be correlated with clinical findings. Often, CrP increase occurs before the symptoms become apparent, therefore temporal connections should be considered as well.
- High concentrations of CrP may produce a dose hook effect, resulting in incorrect interpretation of CrP levels. High dose hook effect has not been observed with this test up to 2000 mg/L of CrP.

EXPECTED VALUES
CrP plasma levels increase within 6 to 8 hours after occurence of an acute event like for example a bacterial infection or trauma and reach their peak within approximately 48 hours after the occurence of an event. The levels fall quickly after the causing event stops, with the given CrP half-life being 48 hours.
Usually, the severity of the inflammation and the inflammation activity influence the extent of the CrP increase. Values of 10 to 40 µg/ml often coincide with mild inflammation like local bacterial infections, abscess, mild trauma, malignant tumors, most viral diseases etc. Up to 100 µg/ml CrP indicate severe illness with inflammation that usually requires immediate medical treatment measures.
Values higher than 100 µg/ml are found e.g. in bacterial sepsis or major surgical procedures.

PERFORMANCE CHARACTERISTICS
Sensitivity and Specificity
The CRP Test has been evaluated with a leading commercial CRP EIA test using clinical specimens. The results show that the sensitivity of the CRP Test
is >99.9% and the specificity is 97.5% relative to the leading EIA test.

Method		**EIA test**		**Total result**
CRP Test	Result	Positive	Negative	
	Positive	67	12	79
	Negative	0	473	473
Total result		67	485	552

Relative sensitivity: 67/67=>99.9% (95%CI*: 95.6%~100%)
Relative specificity: 473/485=97.5% (95%CI*: 97.5%~98.7%)
Accuracy: (67+473)/(67+12+473)=97.8%(95%CI*: 96.2%~98.9%). *Confidence Intervals

The CRP Test has been tested by Rheumatoid Factor, HAMA,, HBsAg, HBsAb, HBeAg, HBeAb, HBcAb, syphilis, anti-HIV, anti-H.pylori, MONO, anti-CMV, anti-Rubella and anti-Toxoplasmosis positive specimens.
The results showed no cross-reactivity.

Interfering Substances
The following potentially interfering substances were added to CrP-negative and -positive specimens

Acetaminophen: 20 mg/dL	Caffeine: 20 mg/dL
Acetylsalicylic Acid: 20 mg/dL	Gentisic Acid: 20 mg/dL
Ascorbic Acid: 20mg/mL	Albumin: 10,500mg/dL
Creatine: 200 mg/dL	Hemoglobin 1,000 mg/dL
Bilirubin: 1,000mg/dL	Oxalic Acid: 600mg/dL
Cholesterol: 800mg/dL	Triglycerides: 1,600mg/dL

None of the substances at the concentration tested interfered in the CRP Test.

LITERATURE
1. Morley JJ, Kushner (1982) Serum C-reactive protein levels in disease. In: Kushner I, Volanakis JE, Gewurz H,eds. C-reactive protein and the plasma protein response to tissue injury. Ann. NY Acad. Sci. 389: 406-417.
2. Peltola HO (1982) C-reactive protein for rapid monitoring of infections of the central nervous system. Lancet:980-983.
3. Macy EM, Hayes TE and Tracy RP (1997) Variability in the measurement of C-reactive protein in healthy subjects: implications for reference intervals and epidemiological applications. Clin. Chem. 43, 52-58.

SYMBOLS

CE	CE mark according to the requirements of Annex III of the European Directive 98/79 EC	REF	Catalogue number
IVD	In vitro diagnostic medical device	2	For single use only
Σ n	Content sufficient for <n> tests		Use by
LOT	Batch code		Temperature limitation
	Manufacturer		Consult instruction for use

Rev D2.0 – (EN) – 05.05.2023

Hergestellt für
TMS Neuhaus GmbH
Südstraße 25
47475 Kamp-Lintfort

fon 02842 331 0
info@tms-neuhaus.de
www.tms-neuhaus.de

Dutch Diagnostics
human and animal care

Hersteller
Dutch Diagnostics BV
Hekkehorst 3
7207 BS Zutphen

fon +31 575 512 300
info@dutch-diagnostics.com
www.dutch-diagnostics.com